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Communications and Information

DEPLOYABLE COMMUNICATIONS STANDARDS-DEPLOYED SYSTEMS CONTROL FACILITY

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This instruction implements policy found in Air Force Policy Directive 33-1, *Command, Control, Communications, and Computer (C4) Systems*. This instruction establishes the policy and procedures for deployed systems control facilities (SCFs) or other similar facilities, and supporting activities. In addition, it provides guidance and direction for communications-computer systems controllers on the management of deployed SCFs and communications systems. This instruction applies to all PACAF active and PACAF-gained active deployable communications organizations. This instruction does not replace technical orders used in conducting tests or maintenance of equipment. This publication does not apply to ANG and USAFR units and members. Note: For the purpose of this instruction, Systems Control Facility (SCF) is synonymous with Technical Control Facility (TCF).

1. Control Responsibilities. This paragraph outlines the general responsibilities of personnel performing SCF functions, with respect to the operation, maintenance, and quality control (QC) of deployed communications systems. A system is a set of components coordinated to accomplish a set of objectives. Therefore, the deployed communications system includes everything from one user's terminal equipment to the distant user's terminal equipment. SCFs interface complex analog and digital systems and provide continuous technical supervision over the deployed communications system for maximum quality, reliability and flexibility. The SCF is responsible for integration of the diverse system components to form the whole complex known as the deployed communications system. The requirements of this instruction also apply at locations where other personnel perform limited SCF functions.

1.1. Functions and Responsibilities.

1.1.1. Air Force Forces Systems Control (AFFOR SYSCON). The AFFOR SYSCON serves as the single point of responsibility for Air Force Command and Control Communications Computer (C4) system matters and is subordinate to Joint Communications Control Center (JCCC). The SYSCON will exercise management control over AF control centers belonging to deployed components and subordinate commands IAW CJCSM 6231.01. (See **Figure 1.**)

1.1.1.1. Tactical Network Analysis and Planning System Plus (TNAPS+) has been selected as the communications planner and architectural management tool for the Joint Defense Information Infrastructure Control System – Deployed (JDIICS-D) by PACAF.

1.1.1.2. Para **1.3.** provides and overview of the systems management products that can be derived from TNAP+.

1.1.2. Unit Level Communications Focal Point (CFP). CFP is responsible to exercise management control over subordinate communications elements as directed by the AFFOR SYSCON or applicable OPLANs. The CFP as used in this instruction is a distinct and separate function. Some of the functions and responsibilities of the SYSCON/CFP are:

1.1.2.1. Responding to operational direction of the AFFOR SYSCON.

1.1.2.2. Exercising operational direction and management control over all assigned subordinate control facilities, transmission systems, networks, etc.

1.1.2.3. Functioning as the reporting facility for all assigned subordinate control facilities, transmission systems, networks, etc.

1.1.2.4. Recording and reporting all outages and degradation’s occurring at subordinate facilities.

1.1.2.5. Maintaining a master station log (MSL) to record information on significant events occurring within the area of assigned responsibility.

1.1.2.6. Maintaining cognizance of the current operational status of all subordinate facilities.

1.1.2.7. Directing subordinate facilities to implement restoral plans during major system failures.

1.1.2.8. Maintaining a listing of all major equipment at subordinate facilities.

1.1.2.9. Requesting and directing special testing to isolate system and network problems.

1.1.2.10. Referring system/network problems beyond the capability of the SYSCON/CFP to the AFFOR SYSCON.

1.1.2.11. Acting as the sole approving authority for authorizing temporary removal of diversity equipment at subordinate facilities.

1.1.2.12. Coordinating scheduled service interruptions.

1.1.3. Systems Control Facility (SCF). The SCF exists in all deployable communications units. Some of the functions and responsibilities of the SCF includes:

1.1.3.1. Responding to the operational direction of the SYSCON/CFP.

1.1.3.2. Exercising technical supervision over subordinate facilities, transmission systems, trunks and circuits.

1.1.3.3. Reporting equipment/circuit/system outages, troubleshooting updates, restorals, reason for outage (RFO), and circuit/systems activation's/deactivations to SYSCON/CFP.

1.1.3.4. Taking immediate action on any deterioration or failure of systems, trunks, circuits or equipment that is causing degradation or loss of user service.

1.1.3.5. Coordinating with adjacent facilities, using agencies, maintenance agencies, and commercial vendors to effect restoration of service.

1.1.3.6. Implementing restoral plans at the direction of the SYSCON/CFP.

1.1.3.7. Performing QC tests and measurements on all trunks, channels, circuits and equipment for which the SCF is responsible.

1.1.3.8. Ensuring the quality of transmission systems, timing and synchronization, circuits, and equipment via quality assurance programs.

1.1.3.9. Coordinating circuit and system activation's and deactivations via voice or data orderwires, IAW EXORD/OPORD/Annex K installation priorities.

1.1.3.10. Supporting preventive and corrective maintenance actions.

1.1.3.11. Maintaining current communications operating instructions (COI) and reference libraries.

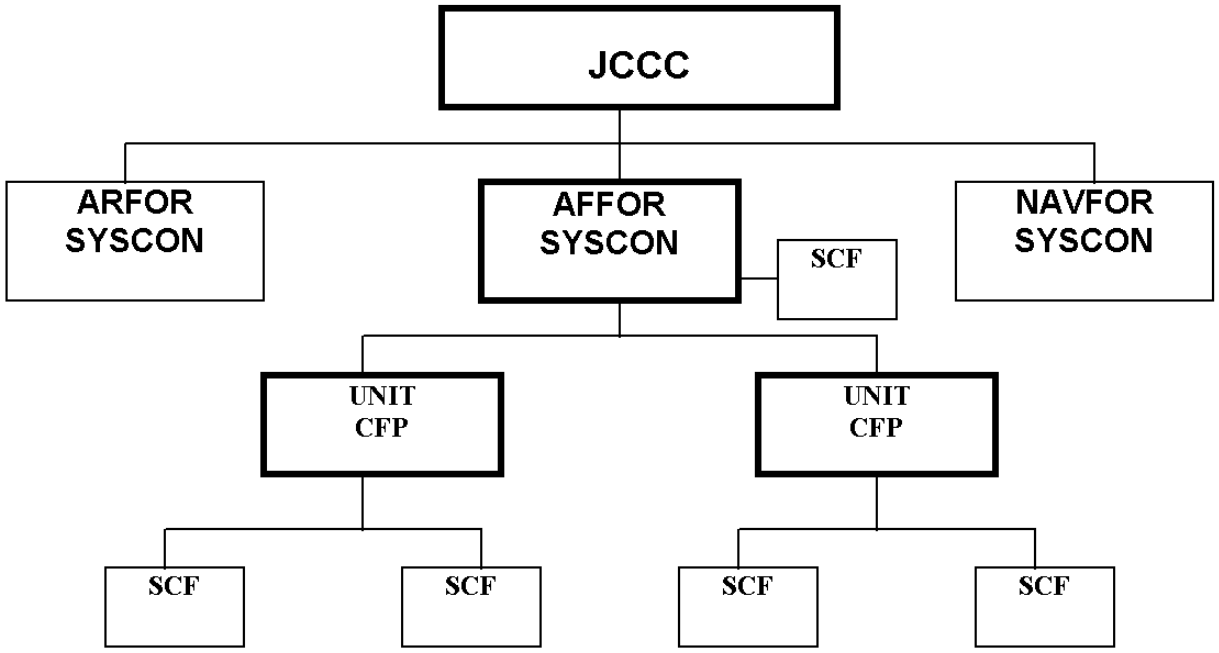
1.1.3.12. Maintaining required logs, records, and forms up to date and accurate.

1.1.3.13. Labeling patch bays, test boards, or other circuit access points normally used by systems control personnel. As a minimum, labeling will include circuit designator and telecommunication service priority (TSP).

1.1.3.14. Directing and managing high frequency (HF) radio communications systems

1.1.3.15. Developing, directing, and conducting a local training program.

Figure 1. Typical Theater SYSCON Configuration.



1.2. Policy.

1.2.1. Training. Use AFI 36-2201 and this publication to qualify technical controllers. Qualification training will ensure experienced systems controllers remain proficient and inexperienced personnel receive prompt training Require Qualification Training (QT) for all newly assigned SCF personnel. QT will be recertified annually. This training must include, but is not limited to, the following:

1.2.1.1. Unit mission.

1.2.1.2. Chain of command.

1.2.1.3. OPLANs supported.

1.2.1.4. Local area familiarization.

1.2.1.5. Station operating procedures and location of COIs, reference library, records, and forms.

1.2.1.6. Operation and capabilities of all equipment utilized in or by the SCF.

1.2.1.7. Purpose and capabilities of connected user and transmission facilities.

1.2.1.8. Orderwire connectivity, limitations and use.

1.2.1.9. Safety, security and emergency procedures.

1.2.1.10. Procedures and requirements for submission of regular and special reports, and sta-

tus reporting.

1.2.1.11. Performance of QC measurements, their scheduling, and required actions when measurements are below standards.

1.2.2. Familiarization. Part of the training program should include visits to customers, lateral workcenters, and other SCFs. The objective of these visits is to achieve and maintain good working relationships between personnel of each facility and an understanding of each other's mission, capabilities, and limitations. These visits must occur regularly to be effective.

1.2.2.1. Orderwire Procedures . The SCF will establish orderwires with all on-line operations shelters and equipment vans. In addition, the appropriate systems management element and adjacent SCF/PTFs require orderwires. Effective operation of deployed communications systems require frequent coordination between SCFs. Accomplish this coordination over voice and teletype orderwire circuits. Effective orderwire use achieves maximum efficiency of SCF operations. Sloppy orderwire discipline contributes to confusion and to misunderstandings.

1.2.2.1.1. Require administrative call signs on all orderwires.

1.2.2.1.2. Require maximum use of operating signals contained in ACP-131. Encourage use of generally accepted communications and systems control phraseology.

1.2.2.1.3. All orderwire entries will include the date, ZULU time, and initials or personal sign (i.e., 191100Z/FD).

1.3. TNAPS+. TNAPS+ is a Windows 95 and NT based desktop planning and control system that allows the communications planner to rapidly plan a major communications operation that includes circuit switch, message switch, data, and transmission networks. It covers all TRI-TAC equipment and widely used state-of-the-art commercial equipment (IDNX, AN/FCC-100, routers).

1.3.1. The system will also assist in the development of specific equipment parameters (worksheets and crew assignment sheets) to support these networks. The resulting database can then be used by the controllers (network and equipment), with program software assistance, to monitor, control, and reconfigure the networks based on the evolving battlefield situation. The result will be a communications capability more responsive to the C2 needs of a rapidly initiated and evolving wartime operation that takes maximum advantage of available sophistication built into today’s communication equipment.

1.3.2. New capabilities that have been incorporated into Version 3.0 include:

1.3.2.1. Message Passing that provides for planning high interest telecommunications lists, sending and receiving messages using a TCP/IP network, sending status data via Master Station Log (MSL) entries automatically or manually, disseminating directives via MSL INFO entries.

1.3.2.2. Auto Generated Circuit Layout Records.

1.3.2.3. Enhanced Data Network Planning that includes routers, switches, bridges, comm servers, LANS, NESs, and hosts, IP address assignments, NES range table generation, and equipment port assignments.

1.3.2.4. IDNX Equipment Planning that includes card configurations, port assignments, and

user defined IDNX configuration.

1.3.2.5. Planning for Network timing Sources.

1.3.2.6. WEB access.

1.3.3. The Version 3.0 software will require a higher computer platform that required previously. The minimum platform for Version 3.0 is Windows 95, a 486/66 or higher processor with at least 16MB RAM. A Pentium processor with 32MB RAM is highly recommended.

2. System/Circuit Activation, Change, or Deactivation. This paragraph describes the procedures necessary to activate, change, or deactivate circuits and systems in the deployed communications systems. The tasking order (i.e., EXORD/OPORD or COI) provides the information required for activation of deployed communications systems. Communications circuit summaries or Defense Information Systems Agency (DISA) Telecommunications Service Orders (TSOs) provide basic technical information for all new or changed circuits. The SCF is responsible for activation, change or deactivation of circuits and systems.

2.1. Circuit Summary. Issue a circuit summary to start or deactivate deployed circuits. Use a circuit summary as the authority to obtain specific devices necessary for the installation and operation of the circuit. The circuit summary will contain the following minimum information:

2.1.1. Command Communications Service Designator (CCSD)

2.1.2. Telecommunications Service Priority (TSP)

2.1.3. Terminal information to include:

2.1.3.1. Terminal location

2.1.3.2. User

2.1.3.3. Type of Equipment

2.1.3.4. Point of contact and phone number

2.1.4. Type of circuit

2.1.5. Circuit routing

2.1.6. Remarks (i.e. signal level and frequency, user equipment, data rate, etc.)

2.2. Telecommunications Service Order (TSO). The TSO is the authorization from DISA to start, change, or discontinue a circuit, to amend previously issued TSOs, and to effect administrative changes. The TSO is the authority for the supporting agencies to procure specific devices and ancillary equipment necessary for the installation or operation of the circuit. DISA may issue a verbal TSO in the form of a Operational Direction Message (ODM) when there is not sufficient time to prepare and distribute a record TSO. A follow-up record TSO will subsequently confirm these. DISAC 310-70-1 contains the breakdown of the TSO format and responsibilities of the Circuit Control Office (CCO).

2.3. System Activation and Alignment Procedures. The following procedures are the basis for all system activations within deployed communications systems. Units will establish written procedures, standards, and assigned responsibilities for system activation.

2.3.1. Unit Type Code (UTC) Generation. Generation is complete for an UTC when the equipment provides the minimum mission capability. SCF and maintenance activities must have completed all subsystem checks, including cables, IAW applicable TOs, unit procedures, and unit checklists. All subsystems must be ready to activate circuits.

2.3.2. System Activation. Conduct testing using procedures and standards contained in this instruction. Any system not meeting the standards will be identified to the SYSCON/CFP. End-to-end (user to user) activation of a circuit other than an orderwire determines system activation. Advise SYSCON/CFP of the system activation times, and note exceptions in the MSL.

2.4. Circuit Installation, Alignment, and Test Procedures.

2.4.1. There are certain functional steps for activating circuits that are common to all facilities and military services. Activate all circuits by their activation priority. Upon receipt of a circuit summary/TSO, the following steps are necessary to install, align, and test the circuit:

2.4.1.1. Preparation of work orders, or instructions to sections responsible for performing facility wiring. Prior to deployment, hard wire all circuits being used for more than seven days that traverse the SCF. Label all circuits to include, as a minimum, the CCSD and TSP.

2.4.1.2. Performance checks of facility wiring to ensure compliance with work orders. Close coordination between the section preparing the facility wiring and the SCF performing the in-station tests to prevent errors in the circuit installation and to ensure technical parameters.

2.4.1.3. Performance of circuit/system alignment tests with adjacent SCFs.

2.4.1.4. Notify the distant end SCF that in-station and adjacent systems tests when completed and meet required criteria.

2.4.1.5. Verification of circuit acceptance by the user.

2.4.1.6. Recording and reporting of circuit activation.

2.4.2. Upon completion of the in-station installation, the SCF is responsible for the in-station and out-station alignment of the circuit. Align the circuit end-to-end after adjusting the in-station portion of the circuit. Additional checks as required, will ensure conditioning and signaling equipment is functioning properly.

2.4.3. Test each circuit IAW the criteria specified in this instruction and DCS Technical Schedules. The SCF designated as the CCO will initiate end-to-end tests of the circuit. DISAC 310-70-1, Chapter 6 shows the specific tests required ensuring compliance with the DCS technical parameters IAW DISAC 300-175-9. Annex C of this instruction contains the non-DCS circuit requirements.

2.5. Notify the CCO and the SYSCON when encountering or anticipating delays in activation of circuits. The notification will contain detailed information concerning reasons for delay and recommendations for alternate methods of providing service.

2.5.1. Deactivate circuits as directed by the SYSCON/CFP or by priority from lowest to highest.

3. HF Radio Frequency Management. Frequency management is the responsibility of all users of the electromagnetic spectrum. In-garrison frequency management is the responsibility of the installation fre-

quency manager. During exercises/contingencies the highest deployed systems management staff will have the overall responsibility for Air Force frequency management.

3.1. SCF Responsibilities.

3.1.1. Maintaining a list of authorized frequencies and authority for each frequency and have ready access to frequency authorizations.

3.1.2. Posting changes to frequency authorizations.

3.1.3. Together with the Frequency Management System (FMS) operator, directing the use of authorized frequencies on all HF systems/nets traversing the SCF.

3.1.4. In conjunction with the FMS operator, coordinating the use of shared frequencies to avoid interference.

3.1.5. Maintaining current propagation forecast charts.

3.1.6. Maintaining the applicable portions of Annex K of the OPORD/EXORD or Communications Operating Instruction (COI) for purposes of defining the overall communications systems. In addition, Annex K identifies the "master/slave" relationship needed for purposes of overall systems control and systems management.

3.1.7. Acting as the control point for all HF/ISB, HF data, and TADIL A systems traversing their facility.

3.2. Actions.

3.2.1. SCF NCOIC . The SCF NCOIC will ensure personnel are familiar with the frequencies authorized for each HF link. When required, the SCF NCOIC will submit request for new frequencies through established frequency management channels.

3.2.2. Frequency Changes. The Net Control Station (NCS) on all HF/SSB and the receiving station on all other HF systems are responsible to direct frequency changes.

3.2.3. Channel Terminations. Terminate all receive data channels during frequency changes. Disabling of send channels during transmit outages is also accomplished when such action disables the sending equipment. Advise the communications center to hold traffic during this time.

4. Service Interruptions. It is inevitable that communications interruptions will occur, either for planned periodic maintenance or for unforeseeable events. Consequently, all circuits entering the SCF will be accessible for control and restoral purposes. The SCF must establish procedures for the rapid identification of communications failures and must take decisive action to restore service in minimum time.

4.1. Scheduled Service Interruptions. Policy requires the deployed communications system to provide the best possible communications service to customers. High quality communications generally require the periodic removal of equipment from service. When this is absolutely necessary the planning, notification, and restoral of service come under the direct control of the SCF. When scheduled service interruptions are necessary, SCFs will:

4.1.1. Coordinate with the local users, if applicable, and adjacent systems controls to obtain user release.

4.1.2. Coordinate with SYSCON/CFP or applicable agencies for final approval of service interruption.

4.1.3. Upon approval by proper authority, notify maintenance control of the release.

4.1.4. Notify the affected users, log the circuit or system out and apply necessary outage procedures.

4.1.5. Stop all traffic before taking any action that will interrupt its flow.

4.2. Unscheduled Service Interruptions. Occasionally, transmission media can interrupt traffic due to unforeseen events, transmission media degradation or equipment failure. Preemption of a circuit to restore a higher priority customer may interrupt traffic. In all cases the SCF will notify the customer of the transmission failure or preemption. Notify customers when service upon restoral.

4.3. Circuit Outages. The customer logs the circuit out when experiencing degraded service. The customer relinquishes control to the SCF for corrective action. The SCF is responsible to identify all system, link, trunk and circuit outages as well as degradations, such as, loss of diversity equipment to SYSCON/CFP. Distant stations, commercial carriers, and local users coordinate as necessary to isolate and report troubles.

4.4. Fault Isolation. Each SCF will develop written local fault isolation procedures based upon the particular type of equipment installed in that facility, patch panels, test points, and available test equipment. The procedures will contain appropriate diagrams showing the test tone levels, impedance, signaling frequency, and operating levels for each test point throughout the facility. The procedures will clearly delineate those functions performed by SCF personnel and those accomplished by maintenance support elements. SCF performs or coordinates all fault isolation.

4.5. Commercial Circuit Outages. Close coordination with the local carrier is essential to ensure circuit reliability. The Defense Information Telecommunications Contracting Office (DITCO) specifies circuit parameters, CCO responsibilities and demark locations for stateside leased circuits.

4.5.1. When leased circuits fail to meet parameters the SCF logs the circuit out to the commercial carrier. DISAC 300-175-9 contains leased circuit standards.

4.5.2. The SCF must ensure the government furnished terminal equipment or circuit segments is not the cause of the fault before reporting an outage to the commercial carrier. If the government furnished segment or equipment causes the trouble, do not report the failure to the commercial carrier.

4.5.3. Whenever an outage attributable to leased lines occurs, the servicing SCF notifies the carrier responsible for end-to-end service of the outage. It is important that both servicing SCFs notify their commercial carriers. Consider leased circuits logged out of service out in both directions. The SCF will obtain a circuit outage number and initials of the carrier's representative after notifying the carrier or authorized representative of the outage. Indicate this information on the DD Form 1443, Trouble and Restoration Record and MSL.

4.6. Circuit Restoration. Isolation of transmission media troubles authorizes the preemption of lower priority circuits. However, correct equipment malfunctions rather than preempting a working circuit when the time required by each method is nearly the same. One station will direct circuit restoration. If a conflict occurs, the AFFOR SYSCON will indicate which station will direct restoration procedures.

4.6.1. Link. The SCF will develop restoration plans for each transmission link that traverses their station. The SYSCON will direct implement of restoral plans and direct restoral of multiple link failures.

4.6.2. Circuit. Restore individual circuits IAW their restoration priority or as directed by the SYSCON/CFP.

4.6.2.1. Accomplish restoration of service to users by repairing or replacing faulty equipment or by altrouting the circuit around the disrupted segment.

4.6.2.2. Prepare cross-reference data to permit proper identification of systems during coordination of service restoration. For example, use commercial circuit numbers to identify circuits to commercial agencies. Maintain this cross-reference information on the circuit layout record (CLR) in a position readily available to SCF personnel.

4.6.2.3. The technical controller will refer to circuits and trunks by CCSD and CSD respectively.

4.6.2.4. The primary responsibility for altroute action rests with the servicing SCF of the user reporting the outage. Notify the affected SCFs and the SYSCON when altroute action is unable to be accomplished.

4.6.2.5. When the trouble on the normal path of a circuit is corrected and the circuit has been tested, the controller initiating the altroute will take action to return the circuit to its normal path.

4.7. Status Reporting. The SCF is the central point for reporting communications outages. When users or maintenance agencies become aware of a system, link, or circuit outage or degradation they will notify the SCF. Report local telephone troubles to the appropriate maintenance agency. The SCF will notify the SYSCON/CFP of:

4.7.1. Station outages.

4.7.2. Power failures.

4.7.3. HAZCONs.

4.7.4. Link outages of one minute or greater in duration.

4.7.5. Trunk outages of 10 minutes or greater in duration.

4.7.6. Circuit outages of 10 minutes or greater duration.

4.7.7. Circuit preemptions.

4.7.8. Any other significant events that they feel will impact communications.

5. Quality Assurance Program. Quality Assurance (QA) provides maximum communications capability throughout the deployed communications system, by identifying degradations in time to permit corrective action before significant deterioration or failure of communications occurs. The QA program assigns this function to SCFs. The systems controller must develop a thorough understanding of the overall system performance, the causes and effects of communications degradation, critical areas of concern, and aggressive systematic fault isolation techniques. Therefore the systems controller must have a strong voice in establishing the priority and time sequencing of maintenance actions.

5.1. Quality Assurance. An effective QA program consists of scheduling prescribed tests, measuring specific parameters, comparing recorded measurements against established standards, analyzing trends, and directing corrective actions. Units will perform and ensure QA testing and documented on all systems/circuits on a periodic basis. Categorize QA programs within the deployed communications system as:

5.1.1. Out-of-service QC.

5.1.2. In-service QC.

5.1.3. Equipment sub-system QC.

5.1.4. Tactical Performance Assessment Program (TPAP).

5.1.5. Analysis.

5.1.6. Circuit Quality Control. Each SCF will establish the following circuit QC programs.

5.1.6.1. Out-of-Service QC Program. The SCF will schedule out-of-service QC testing on all assigned DCS and commercial circuits. Periodic out-of-service testing permits end-to-end realignment of circuits to meet applicable deployed communications and DCS circuit parameters. Out-of-service testing may require user release of the circuit. Notify the affected user before preemption when preempting a lower priority circuit to restore service. Test DCS circuits IAW DISAC 310- 70-1 and DISAC 300-175-9. A transmission media failure, suspected faulty equipment or lines, or when deemed necessary by the SCF requires selected out-of-service end-to-end tests. Use DD Form 1697 to record all out-of-service QC test data. Accomplish the following types of out-of-service tests.

5.1.6.1.1. Initial Test and Acceptance . New circuits require these initial test and acceptance checks.

5.1.6.1.1.1. Test DCS circuits IAW DISAC 310-70-1, Table 6-1.

5.1.6.1.1.2. Test non-DCS circuits IAW Annex C. Sites may use automated data instead of manually written forms, but must be able to retrieve hard copy.

5.1.6.1.2. Periodic Tests. Accomplish periodic out-of-service testing on all DCS circuits IAW DISAC 310-70-1. Annex C contains the requirements for non-DCS circuits.

5.1.6.1.3. Test Schedule Flexibility. Flexibility of test schedules will allow for non-availability of test equipment, circuit outages, or other unforeseen circumstances. Perform circuit testing within seven days of the scheduled testing date to fulfill the scheduled testing requirement.

5.1.6.1.4. QC of Multi-point Circuits. Multi-point circuits having large numbers of subscriber tail segments (such as weather, facsimile, etc.) and covering large geographical areas can cause significant problems to the systems controller attempting to perform periodic QC tests. Since multi-point circuits generally receives more attention from systems controllers and subscribers, the systems management staff may waive out-of-service QC test requirements on a case-by-case basis when it isn't practical to comply with the scheduled testing requirements in this paragraph.

5.1.6.2. In-Service QC Program . Require weekly in-service QC testing for all active circuits within the SCF. In-service testing monitors normal circuit traffic signals. These tests

include, but are not all-inclusive, signaling frequency (SF), transmission level, voice peaks, and noise. When faults are located, remember, fix the cause of the fault, not just the symptom.

5.1.6.2.1. Use high impedance measurements to prevent interruption of customer service. Take measurements at the transmit line monitor jack on the transmission patch bay and the user patch bay.

5.1.6.2.2. Units will maximize use of automatic testing devises for in service testing. Use automated test equipment results instead of manual tests.

5.1.6.2.3. User equipment frequently introduces excessive signal levels into the system. Excessive signal levels from just few users can cause high noise across the entire baseband of an analog system. Immediate action is necessary to locate the source upon detecting excessive signal levels. Correct excessive levels, 3 dB hot, as soon as possible. When the signal level exceeds 6 dB, correct the level immediately or taken out of service. Properly document actions of this nature and immediately report to the appropriate SYSCON/CFP.

5.1.7. Equipment Sub-system QC Program. The SCF will establish written guidelines for equipment subsystems QC testing. Accomplish subsystem QC checks before equipment use and regularly during deployment. The following subsystem checks are mandatory at each SCF.

5.1.7.1. AN/TSQ-111 Sub-system QC Program. The AN/TSQ-111 will be subsystem QC tested using TO 31S1-2TSQ111-1 on a weekly basis. Computerized formats will suffice for documentation on CNCE applications. Apply similar function for TSQ-201.

5.1.7.2. Ancillary Equipment Sub-system QC Program. All ancillary equipment and vans will be subsystem QC tested before use IAW applicable TOs. Subsystem testing includes cabling, voice switching systems, digital switching systems, HF systems, modems, and multiplexers. Indicate the completion of subsystem testing in the MSL along with discrepancies noted.

5.2. Tactical Performance Assessment Program (TPAP). TPAP applies to all operational systems established for three or more days unless otherwise specified by OPORD or by appropriate systems management element. Applicable EXORD/OPORD Annex K or the appropriate SYSCON provides specific TPAP reporting procedures. TPAP is designed to:

5.2.1. Monitor the operation of deployed transmission links on a real time basis to detect performance trends and correct degradation before loss of service occurs.

5.2.2. Develop baselines for future deployment plans and equipment upgrades.

5.2.3. Assure system visibility to deployed commanders and management.

5.2.4. Provide quality communications service to users in a deployed environment.

5.3. Operational Performance. After facility acceptance and all circuits are tested, the SCF will continue operational performance monitoring at least once per 12-hour shift. When parameters do not meet the standards specified, the SCF will initiate corrective action. Standards provided in Annex B apply to circuits and systems routed over any combination of military paths (eg. cable, fiber, satellite, tropo/LOS). For circuits routed over both military and commercial leased paths, the standards set forth in DISAC 300-175-9 will apply.

5.4. Operational Performance Monitoring. When parameters do not meet the standards specified, the SCF will initiate corrective action.

5.4.1. HF/ISB Operational Performance Tests:

5.4.1.1. Make voice checks hourly on the voice orderwire unless traffic has been passed within 60 minutes.

5.4.1.2. Perform operational checks hourly on each TTY orderwire not in receipt of traffic within 60 minutes.

5.4.1.3. Perform distortion checks on at least one spare channel of each active VFCT.

5.4.1.4. Document all results.

5.4.2. Wideband Operational Performance Tests for Analog (FDM) Systems:

5.4.2.1. Perform Test Tone Level (TTL) and Idle Channel Noise (ICN) on at least 3 channels of every wideband link terminating in the SCF. Select channels from high, mid, and low points in the baseband and rotate through all channels. If TTL is out of tolerance, correct the level or substitute the channel before taking ICN. Perform TPAP measurements daily during periods of maximum propagation stability, avoiding the sunrise/sunset transitions.

5.4.2.1.1. The Tactical Engineering Support Program (TESP) office will determine the ICN standard.

5.4.2.1.2. ICN measurements less than 5 dB noisier than the standard are GREEN.

5.4.2.1.3. ICN measurements 6 dB to 11 dB noisier than the standard are AMBER.

5.4.2.1.4. ICN measurements greater than 11 dB noisier than the standard are RED.

5.4.2.2. Obtain RSLs simultaneously from both wideband terminals. The following conditions constitute an AMBER RSL that requires investigation:

5.4.2.2.1. Reciprocal differences greater than 5 dB.

5.4.2.2.2. RSL disparity greater than 3 dB between receivers.

5.4.2.2.3. RSL greater than 6 dB below the established link standard.

5.4.2.3. Obtain BBLs from both wideband terminals during the same time frame as TTL and ICN. Any BBL measurement exceeding the calculated maximum BBL is AMBER.

5.4.2.4. Wideband Operational Performance Tests for Digital (TDM) Systems:

5.4.2.4.1. RSL from both wideband terminals every 12 hours. Compare reciprocal readings and investigate differences of greater than 5 dB.

5.4.2.4.2. If automated means are available to monitor mission bit stream (MBS) parameters, analyze these parameters to determine the health of the system.

5.4.2.5. Satellite Communications Operational Performance Tests (Accomplish testing daily):

5.4.2.5.1. Total output power from near end terminal.

5.4.2.5.2. RSL from near end terminal.

5.4.2.5.3. BER from near end terminal.

5.4.2.5.4. Tracking from near end terminal.

5.5. Communications Analysis . Perform some form of evaluation to add value to the collected performance data. Therefore, the SCF NCOIC will establish a viable communications analysis program. This program should include analysis of circuit outage data, in-service and out-of-service data, and TPAP data. Highly encourage the use of graphs and computer aided analysis. The systems controller performing testing is responsible for real-time analysis of data. Analysis information is for local use unless specific plans or instructions require up-channel reporting. The TESP office may be required to prepare a post deployment report.

5.6. Quality Assurance Management. QA is the responsibility of each technical controller within the deployed communications system. The SCF supervisor will advise the SCF NCOIC of any problem areas, and of any circuits or systems that might require further testing.

5.6.1. The SCF will maintain local operating instructions outlining procedures required for reporting substandard equipment to maintenance, coordinating with users, and coordinating with commercial carriers.

5.6.2. The NCOIC SCF will take action through appropriate channels to obtain required test equipment. When an item of test equipment is inoperative or turned-in for calibration, and a suitable substitute is not available, declare the test equipment mission essential. Make every effort to obtain replacement equipment so fault isolation and QC functions are not impaired.

6. Operational Control of Maintenance Support. Operational requirements of the deployed communications system make it mandatory that the system operates at maximum efficiency. The complex nature of the system requires detailed coordination between technical controllers and maintenance personnel to achieve the desired results. Transmission quality is reflective of maintenance and operational practices. Therefore, to provide the required service to all users perform these functions outstandingly.

6.1. Responsibility.

6.1.1. In coordination with the SCF Chief or designated representative, the SYSCON will maintain operational control over all on-line maintenance. In this respect, they will have authority for determining the acceptance of all communications equipment after maintenance, alignment or repair; approval of all on-line maintenance; and the verification of equipment's operating status after tests. Categorize equipment as follows:

6.1.1.1. On-line equipment.

6.1.1.2. Standby equipment.

6.1.1.3. Spare equipment.

6.1.1.4. Equipment for repair or modification.

6.1.2. Where service must be interrupted for maintenance, either on a scheduled or unscheduled basis, the SYSCON will:

6.1.2.1. Notify the SCF when removing equipment from service for maintenance.

6.1.2.2. Coordinate maintenance schedules with the SCF.

6.1.2.3. Coordinate restoral priorities with the SCF.

6.1.3. The SCF will:

6.1.3.1. Obtain a JCN for all SCF equipment turned over to maintenance.

6.1.3.2. Monitor, when possible, the performance of any QC testing accomplished- by maintenance personnel.

6.1.3.3. Perform acceptance tests before placing equipment or circuits in service.

6.1.4. The maintenance supervisor or designated representative will develop local written procedures to:

6.1.4.1. Coordinate maintenance downtime schedules with the SCF.

6.1.4.2. Obtain approval from the SCF shift supervisor before taking any equipment off-line for maintenance.

6.1.4.3. Inform the SCF of any on-line maintenance activities before work begins.

6.1.4.4. Assist the SCF shift supervisor in the completion of acceptance tests to verify equipment operating conditions.

6.1.4.5. Coordinates PMEL schedules with the SCF supervisor.

7. Records and Forms. As the central coordinating agency, the SCF maintains logs and other records that provide the only composite record of the station's total operational performance. Complete logs and forms generated in the SCF are the sole authoritative source for the technical operating history of the communications systems within the station. All SCFs will use and maintain DD Form 1753, Master Station Log; DD Form 1441, Circuit Data Record; DD Form 1443, Outage and Restoration Record and DD Form 1700, Record of HF Frequency Changes. DISAC 310-70-1 provides instructions for the use and maintenance of DD Forms. Use automated forms and software when possible instead of these forms. The requirement for all forms as levied by this instruction and applicable HF operations guidelines do not apply for PTF operations as long as all pertinent information is recorded in the MSL or another locally approved form.

7.1. Forms and Their Use.

7.1.1. DD Form 1753, Master Station Log. Maintain the form to provide a narrative summary of significant events. It provides a narrative record of the controller's actions and observations for historical and analysis purposes. Log entries should include, but are not limited to the following:

7.1.1.1. Shift change and duty assignments.

7.1.1.2. Station status.

7.1.1.3. System, trunk and circuit activation’s/deactivations and outages.

7.1.1.4. Coordination with distant stations and maintenance agencies in resolving significant problems.

7.1.1.5. Equipment failures, substitution actions and related job control numbers.

7.1.1.6. Unusual occurrences within the SCF and associated subscribers.

7.1.2. DD Form 1441, Circuit Data. Record technical circuit information on this form to allow fast and easy access during fault isolation. Require DD Form 1441 for all circuits with a life

expectancy of 30 days or more. The circuit TSO is the primary source of technical data used on this form. In-station equipment, circuit appearances, and a circuit layout drawing on the back compose this form. Communications Nodal Control Equipment (CNCE) forms/records and circuit layout records (CLR) are suitable substitutes for the DD Form 1441.

7.1.3. DD Form 1443, Outage and Restoration Record. This record provides a chronology of actions taken to restore circuits or systems. Use the DD Form 1443 to record altroute and equipment workorder information.

7.1.4. Tactical Performance Assessment Program . Use general purpose, automated or locally developed forms to record the TPAP data required by this instruction.

7.1.5. Circuit History File. Maintain a circuit history file on all permanent circuits. At a minimum, the circuit history folder will contain the original and the most current TSO containing end-to-end routing, initial test and acceptance QC data, and the current completion report. Require a circuit history file for all circuits intended for use over 30 days. Retain circuit TSOs or history files in an inactive file for six months after deactivation.

7.1.6. Site Cable and Cross Connect Records. Keep these records current and maintained in the SCF. Information in these records will contain, but is not limited to the following:

7.1.6.1. J-Hocks to equipment cross-reference.

7.1.6.2. Circuit to cable pair cross-reference for each J-hock.

7.1.6.3. Site cable run layout drawing including the connector numbers.

7.1.6.4. List of all cross connects made within the SCF.

7.1.7. Mobility Box/Deployment Check Lists. Inventory lists will be maintained on all mobility boxes, toolboxes, and all miscellaneous equipment required for deployment. Written procedures ensure that the inventory and resupply actions are completed upon return from deployment.

8. Reference Libraries. A reference library is mandatory for each facility performing systems control functions to provide ready reference to technical and policy information required in performance of their duties.

8.1. PACAF Publications. Maintain the current editions of the following PACAF publications in each deployed communications facility performing systems control functions:

8.1.1. PACAF Instruction 33-150 Vol 10, Tactical Engineering Support Program

8.1.2. PACAF COMPLAN 61, PACAF Standard Communications Plan (when published)

8.1.3. Others as directed

8.2. DISA Publications. Require current editions of the following DISA publications: Request DISA publications from HQ DISA, Attn: BIAR, 701 S. Court House Rd., Arlington, Va 22204-2199, using DISA Form 117.

8.2.1. DISAN 210-0-1, Index, DISA Circulars and Notices

8.2.2. DISAC 310-65-1, Circuit and Trunk File Data Elements & Codes Manual of the DCS

8.2.3. DISAC 310-70-1, DCS Systems Control

8.2.4. DISAC 310-130-1, Submission of Telecommunications Service Requests

8.2.5. DISAC 310-130-4, Telecommunications Service Priority

8.2.6. DISAC 300-175-9, DCS Operating-Maintenance Electrical Performance Standards

8.2.7. Current DISA CONEX Plan 10-XX (HF and SHF entry stations)

8.3. JCS Publications. Require the current editions of the following JCS publications for SCFs subject to joint duties.

8.3.1. CJCSM 6231.01, Joint Tactical Communications Systems Management

8.3.2. CJCSM 6231.02, Joint Voice Communications Systems

8.3.3. CJCSM 6231.03, Joint Record Data Communications

8.3.4. CJCSM 6231.04, Joint Transmission Systems

8.3.5. CJCSM 6231.05, Joint Communications Security

8.3.6. CJCSM 6231.06, Joint Technical Control Procedures/Systems

8.3.7. CJCSM 6231.07, Joint Network Management and Control Systems

8.4. Allied Publications. Maintain the current edition of ACP 131, Communications Instructions-Operating Signals, in each deployed communications facility using teletypewriter orderwires and critical control circuits.

8.5. Technical Orders and Manuals.

8.5.1. Technical orders or manuals for each item of test equipment installed or used by personnel performing systems control functions will be available in the facility.

8.5.2. Technical orders or manuals for all terminal and ancillary equipment installed in the facility will be available to personnel performing SCF. This includes all technical orders on the operations facility, and technical orders for all equipment installed within the facility.

8.6. Military Standards. Personnel performing SCF functions will have access to MIL-STD-188-100, Common Long Haul and Tactical Communications System Technical Standards.

8.7. Unit Publications. Maintain all unit publications that supplement this instruction in the reference library.

BERNARD K SKOCH, Colonel, USAF
Director, Communications and Information

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

Terms

Air Force Forces Systems Control (AFFOR SYSCON)—The AF theater level communications management element subordinate to the JCCC. Responsible for maintaining control over and the current status of key systems, circuits, and C-E facilities and major equipment items that are internal to, served by, and/or serve their respective HQ and subordinate commands.

Communications Focal Point (CFP)—The unit level communications management element subordinate to the AFFOR SYSCON. Responsible for maintaining control over and the current status of subordinate systems, circuits, equipments and facilities. The SYSCON replaces the communications focal point (CFP) in communications management. Systems Control Facilities can perform this function when deemed necessary.

Hazardous Condition (HAZCON)—Where diversity operation exists, a HAZCON is the loss of any equipment where the loss of any additional like equipment will result in an outage.

Systems Control Facility (SCF)—The SCF is synonymous with technical control facility (SCF). A physical plant, or designated and specially configured part thereof, containing the equipment necessary for ensuring fast, reliable, and secure exchange of information. This facility/function typically includes distribution frames, patch panels, jacks, and switches; and monitoring, conditioning, orderwire, and test equipment. This facility allows SCF personnel to:
Exercise essential operational control over communication paths and facilities.
Make quality analyses of communication channels.
Monitor operations and maintenance functions.
Recognize and correct deteriorating conditions.
Restore disrupted communications.
Provide requested on-call circuitry.
Take or direct such actions as may be required and practical.

Telecommunications Service Priority (TSP)—A system that provides a means for telecommunications users to obtain priority treatment from service providers for the national security or emergency preparedness (NS/EP) telecommunications requirements. This system replaced the Restoration Priority (RP) system effective September 1990.

Attachment 2

DEPLOYED SYSTEMS ACCEPTANCE TESTS

A2.1. Satellite Communications Systems Acceptance:

A2.1.1. Test all voice channels using Pulse Code Modulation (PCM) or CVSD for TTL and C-notched noise.

A2.1.2. Test all PCM or voice channels programmed for data for compression/expansion linearity. Single channel VFCT circuits with a narrowband frequency shift (± 42.5 Hz) do not require this.

A2.1.3. Obtain RSL and short-term BER from near-end terminal.

A2.1.4. Perform short-term BERT on all DTGs that are not muxed/demuxed in the terminal, providing the SCF can perform the test.

A2.2. Wideband Acceptance for Analog (FDM) Systems:

A2.2.1. Test all voice channels for TTL and idle channel noise (ICN). Perform frequency response on all channels programmed to carry data, facsimile, secure voice, etc., which are sensitive to frequency response variations. VFCT circuits with a narrowband frequency shift (± 42.5 Hz) do not require this test.

A2.2.2. Obtain receive signal level (RSL) readings from the near-end wideband facility.

A2.2.3. If the VFCT will be used during the deployment test all channels of VFCT systems for distortion and ability to print 10 lines of fox test.

A2.2.4. Take RSL and Automatic Gain Control (AGC) readings and compare them with receiver characteristic curves for each van.

A2.3. Wideband Acceptance for Digital (TDM) Systems:

A2.3.1. Perform TTL on all Continuously Variable Slope Delta Modulation (CVSD) voice channels.

A2.3.2. Obtain RSL and baseband bit error rate (BER) from the near-end wideband facility. Maximum acceptable BER (short-term) is 1 x 10 exponent -5.

A2.3.3. Perform short-term BER on all digital trunk groups (DTG) , provided the wideband facility accomplishes no muxing/demuxing.

A2.4. HF/ISB Acceptance:

A2.4.1. Propagation charts will be available in the SCF.

A2.4.2. COIs, authentication tables, and call signs will be available and used.

A2.4.3. Test each voice channel for test tone level (TTL), frequency translation, and signal-to-noise ratio (S/N) using a -10 dbm0, 1004 Hz test tone.

A2.4.4. Check all FTA-28s circuits received in the SCF for proper voice levels.

A2.4.5. Check all Voice Frequency Carrier Telegraph (VFCT) circuits received in the SCF for correct VFCT/data levels.

A2.4.6. All active VFCT channels will be tested for distortion and character error rate for 10 lines of, "The quick brown fox jumped over the lazy dog's back" (fox test).

NOTE: Paragraphs **A2.1.** through **A2.4.** are starting points only. Testing is dependent on existing systems and should be expanded where necessary.

Attachment 3

DEPLOYED PERFORMANCE STANDARDS (NOTE 1)

TEST		PARAMETER
Net Loss (TTL -10 dBm0)		± 1 dB **(Note 2)**
C-notched Noise ratio		24 dB
Impulse Noise		< 15 Counts **(Note 3)**
Frequency Response	VOX	600-2.4 kHz-7 to +12 dB
		400-2.8 kHz-8 to +20 dB
	DATA	1000-2.4 kHz-1 to + 3 dB
		300-2.7 kHz-2 to + 6 dB
		300-3.0 kHz-3 to +12 dB
Max change in audio frequency		5 Hz
Max net loss variation		4 dB
Compression/expansion linearity		0 to -37 dBm0 ± .5 dB
		-38 to -50 dBm0 ± 1 dB
		-50 to -54 dBm0 ± 3 dB
Signal to quantization distortion		0 to -30 dBm0 33 dB
		-30 to -40 dBm0 27 dB
		-40 to -45 dBm0 22 dB
Maximum Operating Signal Level		0 dBm0
Harmonic Distortion		30 dB at 700 Hz
Terminal Impedance		600 Ohms ± 10%
Composite data level		-13 dBm0 ± 1 dB**(Note 2)**
Signaling Frequency level		-20 dBm0 **(Note 4)**
Teletype Distortion		
Total distortion		20%
Mark/Space bias distortion		5% **(Note 5)**
Character error rate		1 x 10E-3
HF voice frequency channel		20 dB receive
S + N/N ratio (1 kHz -10 dBm0)		

VF channel input	0 dBm0 $\pm$ 2 dB
VF channel output	-10 dBm0 $\pm$ 2 dB
Total TTY distortion	25%
Mark/Space bias distortion	5%
Character error rate	1 x 10E-2
BER (30 min)	1 x 10E-5

NOTES:

1. When deployed circuits interface with DCS or commercial leases then the appropriate DISA standards IAW DISAC 300-175-9 will apply.
2. $\pm$ 2 dB for multiple links
3. Analog reference is -72 dBm0. Digital reference is -60 dBm0. Use the digital reference for circuits with one analog to digital conversion. Use the analog reference for circuits with more than one analog to digital conversion.
4. Transmit tolerance is $\pm$ 1.5 dB. When measuring SF on the receive, the tolerance is the loss at that frequency (freq response) plus net loss tolerance (1 dB single link/2 dB multiple link).
5. 12% for commercial circuits

Attachment 4

NON-DCS CIRCUIT QUALITY CONTROL TEST SCHEDULE

TEST	Frequency
Test Tone Level	I,A
Signal to C-Notched Noise Ratio	I,A
C-Message Noise	I,A
Frequency Response	I,A
Envelope Delay (Note 3)	I,A
Max Change in Audio Frequency	I,A
Impulse Noise (Note 3)	I,A
Terminal Impedence	I,A
Transmission Level	I,W
Max Net Loss Variation (Note 1)	AR
Max Operating Signal Level (Note 1)	AR
Non-linear Distortion (Note 1)	AR
Circuit Continuity (Note 1)	AR
Phase Jitter (Note 1)	AR
Compression/Expansion (Note 1)	AR
Bit Error Rate (Note 2)	I,A
Error Free Seconds	AR

LEGEND

I = Initial Test and Acceptance A = Annually

W = Weekly (in-service) AR = As Required Notes

1. This test is accomplished if other measured circuit parameters fail to identify the problem and the troubles persist.

2. Perform BER testing on one spare port of each LSTDM or AN/FCC-100 of equivalent system per radio day.

3. Data circuits only.

This schedule represents the minimum requirements; therefore, increase the frequency of testing by competent authority as necessary.